



7.4 Homeostasis and Cells

Lesson Objectives

-  Explain how unicellular organisms maintain homeostasis.
-  Explain how multicellular organisms maintain homeostasis.

Lesson Summary

The Cell as an Organism Sometimes a single cell is an organism. Single-celled organisms must be able to carry out all the functions necessary for life.

- ▶ Unicellular organisms maintain **homeostasis**, relatively constant internal conditions, by growing, responding to the environment, transforming energy, and reproducing.
- ▶ Unicellular organisms include both prokaryotes and eukaryotes.
- ▶ Unicellular organisms play many important roles in their environments.

Multicellular Life Cells of multicellular organisms are interdependent and specialized.

- ▶ The cells of multicellular organisms become specialized for particular tasks and communicate with one another to maintain homeostasis.
- ▶ Specialized cells in multicellular organisms are organized into groups.
 - A **tissue** is a group of similar cells that performs a particular function.
 - An **organ** is a group of tissues working together to perform an essential task.
 - An **organ system** is a group of organs that work together to perform a specific function.
- ▶ The cells of multicellular organisms communicate with one another by means of chemical signals that are passed from one cell to another.
 - Certain cells form connections, or cellular junctions, to neighboring cells. Some of these junctions hold cells together firmly.
 - Other cells allow small molecules carrying chemical signals to pass directly from one cell to the next.
 - To respond to a chemical signal, a cell must have a **receptor** to which the signaling molecule can bind.

The Cell as an Organism

For Questions 1–5, complete each statement by writing the correct word or words.

1. The term _____ refers to the relatively constant internal physical and chemical state of a living cell.
2. Unicellular prokaryotes, called _____, are adapted to living in a remarkable number of different places.
3. Some unicellular eukaryotes, called _____, contain chloroplasts.
4. Yeasts are unicellular _____, which are eukaryotes.
5. Other unicellular eukaryotes include _____ and algae.

Name _____ Class _____ Date _____

6. How do single-celled organisms maintain homeostasis?

7. Why is maintaining homeostasis particularly important to single-celled organisms?

Multicellular Life

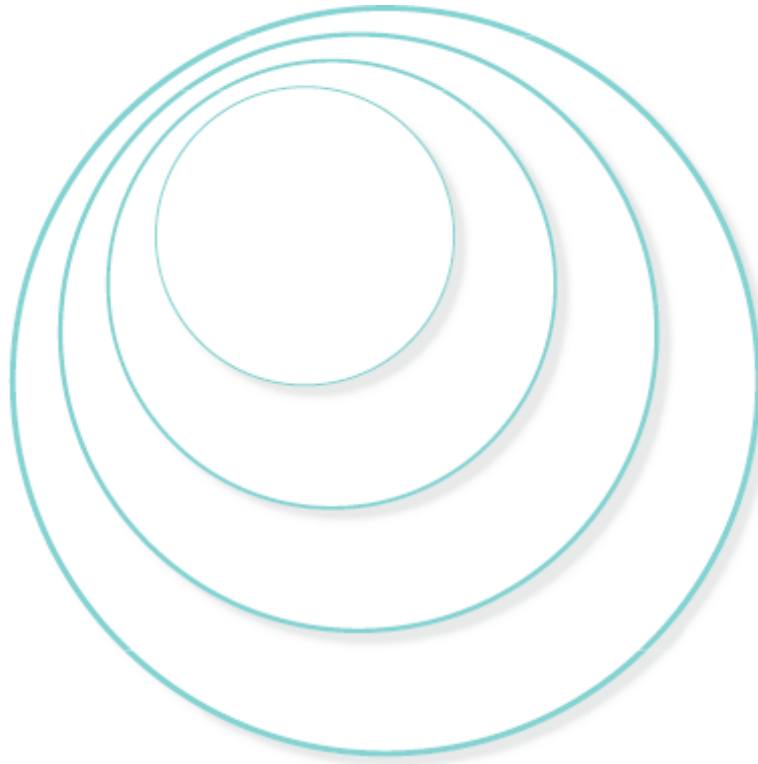
8. How are the cells of a multicellular organism like a baseball team?

9. How does a multicellular organism maintain homeostasis?

10. Complete the table by describing the functions of the specialized cells.

Examples of Specialized Cells		
Type of Cell	Name of Specialized Cell Part	Function of Specialized Cell Part
cells that line the upper air passages in humans	cilia	
pine pollen grains	wings	

11. The Venn diagram below consists of four concentric circles. Complete the diagram to show the relationships among four levels of organization of life. Use the terms *cells*, *organ*, *organ system*, and *tissue*.



12. Starting with the outermost circle of the diagram, explain how each level is related to the next level within each circle.

13. What is the name of the areas that hold adjacent cells together and enable them to communicate?

Apply the Big idea

14. On the Venn diagram above, where would you add a circle that represents the organism level of life? Where would you add a circle that represents another organ of the same organ system?
